SELECT COMMITTEE ON INCREASING THE INTEGRATION OF STEM EDUCATION

Bay Area Regional STEM Education Summit: Advancing STEM through Public-Private Partnerships

-- HEARING SUMMARY --

WINDOW OF OPPORTUNITY
There is a real interest in STEM across all sectors right now. It is imperative to take advantage of the present opportunities to integrate STEM provided by the new Common Core State Standards (CCSS), Smarter Balanced Assessments, and Local Control Funding Formula.

PUBLIC-PRIVATE PARTNERSHIPS KEY TO STEM ADVANCMENT
Public-private partnerships are critical to expanding high quality STEM programs. Important components of an effective public-private partnership include:

- Finding shared values
- A clear, articulated goal
- Measuring results with both qualitative and quantitative data
- Identifying and leveraging the strengths of each partner

Developing strong partnerships across sectors also requires having staff that can make connections solid. Dedicated staff is critical to ensuring that there is communication across sectors, follow through on proposals, and the implementation of ideas.

REGIONAL COLLABORATIONS BENEFIT ALL
Collaborations should be aimed at leveraging the strengths of a region. The benefits of strong, regional collaborations are many, including:

- The strengthening of regional competitiveness
- The creation of a talent pipeline, which will ensure students are graduating with the skills and experiences needed to fill local workforce needs
- Reducing duplication in order to best utilize limited resources
- Increased alignment between education segments and the local workforce

The California STEM Learning Network (CSLNet) is a statewide nonprofit that provides technical assistance and tools to help launch and build the capacity of regional networks as well as assess their progress. There are currently nine regional STEM networks in California. To learn more, visit http://www.cslnet.org/.

CAREER PATHWAYS TRUST GRANT
In the Budget Act of 2013-14, the Legislature allocated $250 million for the establishment of the Career Pathways Trust in order to create innovative programs and partnerships that link academic standards with career pathways in high-need sectors of the economy. In 2014, the California Department of Education funded 39 consortia from a pool of 123 eligible applicants. This past budget cycle, the Legislature appropriated an additional $250 million to the Career Pathways Trust that will be made available through 2017-18. For more information, visit http://www.cde.ca.gov/ci/ct/pt/.

DATA & ACCOUNTABILITY
The importance of collecting and reviewing data cannot be overstated. Strong quantitative and qualitative data will hold stakeholders accountable, guide smart investments, and keep focus on effective programs with proven results. Data will also equip locals with greater leverage when seeking funding.

Local Control Accountability Plans (LCAP) should be used to ensure STEM education is prioritized. CSLNet reviewed the LCAPs of 100 districts and found that there was little mention of science. LCAPs should be looked at critically by all stakeholders to ensure that STEM programs are prioritized and to assess the success or failure of a STEM initiative.

STEAM: THE IMPORTANCE OF INCORPORATING THE ARTS
STEM content blends nicely with the Common Core State Standards across the curriculum. There is an interdependent relationship between applying what is learned in the CCSS to learning in the Arts and using strategies and content learned in the Arts to teach the CCSS. Many skills developed through the Arts are part of the CCSS math standards, including problem solving, estimating, understanding patterning, representing symbolically, and representing symmetry and asymmetry. Additionally, research has shown that what students learn in the arts help them master other subjects, such as reading, science, math or social studies.

The California County Superintendents Educational Services Association (CCSESA) is leading an arts initiative to demonstrate how the Arts integrates with learning in the Common Core. To learn more, visit http://ccsesa.org/wp-content/uploads/2014/12/FINAL-Common-Core-Publication.compressed.pdf

GREAT TECHNOLOGY + GREAT PEDAGOGY = POWERFUL LEARNING
Devices must be incorporated in year-round instruction and used in classrooms as a normal part of studies. Devices cannot be used only to support assessments. In order to incorporate technology effectively, districts must have the proper resources, staff with an expertise and vision to implement smart, technological upgrades, teachers with the proper training, and adequate broadband capacity.

BEING LEFT BEHIND: HIGH SPEED INTERNET IS A POLICY IMPERATIVE
Many schools throughout the state do not have the bandwidth needed to successfully administer the new computer based Smarter Balanced Assessments, let alone the bandwidth needed to support innovative technologies, including digital media, video streaming, interactive learning games, and video conferencing. Costs, existing infrastructure, and location have created a gap between schools with hide speed internet connections and those with slow or no connection. The discrepancy in school internet connection speeds creates inequities in our educational system that will continue to grow as new technologies are developed. Developing a framework that allows schools to dramatically improve networks can be achieved through strategic investments in infrastructure. Smart investments will allow students and educators to use 21st Century learning tools in ways we cannot imagine.

BROADBAND INFRASTRUCTURE IMPROVEMENT GRANT
This past year, while most California students successfully took the new computer-based assessments at their school sites, more than 60,000 students were unable to due to inadequate or inexistent internet connectivity. To support the successful transition to computer-based assessments, the Legislature secured $26.7 million in the 2014-15 Budget for broadband infrastructure improvement grants. First priority grants will support more than 220 schools that were unable to administer the computer-based assessments on-site and have limited or no options to improve their connectivity. While the $26.7 million secured in last year's budget is an important first step, continued investments are necessary to equip schools with the bandwidth needed for full integration of 21st Century learning tools.

In addition to administering grants, the K-12 HSN is required to develop a statewide report of network connectivity infrastructure by March 1, 2015. This report will provide an overview of statewide needs as they relate to broadband.

The Broadband Infrastructure Improvement Grant (BIIG) is a great example of the government, private, and nonprofit sectors working together to solve a statewide issue. Moving forward, it is important that there continues to be strong partnerships between the public and private sectors, including service providers and local education agencies as the process progresses. For more information on the Broadband Infrastructure Improvement Grant, visit http://www.k12hsn.org/biig/.

EXTENDED LEARNING SUPPORTS STEM
In order for STEM initiatives to be successful, STEM programs must be coordinated with after school and summer school programs. After school programs are great opportunities to build on the learning that takes place during the school day. California is a national leader in the quality of its after school programs. The After School Alliance ranked California first nationally in its most recent report. The report shows that 1.66 million students are participating in after school activities in California and that ¾ of these students are engaged in STEM learning opportunities.

CONTACT
Iván Carrillo is Assemblywoman Bonilla's consultant for the Select Committee on STEM. All questions or comments pertaining to the committee should be directed to Iván. He can be reached at 916-319-2014 or ivan.carrillo@asm.ca.gov.

SPECIAL THANKS

Assembly Member Ed Chau, 49th District

HOST:
- o Mills College
- o Alecia A. DeCoudreaux, Mills College
- o Renee Jadushlever, Mills College

PARTNERS:
- o Bay Area Council
- o Bay Area Science Festival
- o Bay Bio
- o California STEM Learning Network
- o TechNet

HEARING PARTICIPANTS:
- o Andreas Cluver, Building and Construction Trades of Alameda County
- o Dr. Barry Russell, Las Positas College
- o Carolyn McIntyre, California Cable & Telecommunications Association
- o Chris Roe, California STEM Learning Network
- o Dr. Elizabeth Watkins, University of California, San Francisco
- o Jim Vanides, Hewlett-Packard
- o Jim Wunderman, Bay Area Council
- o Dr. Kathy Schultz, Mills College
- o L. Karen Monroe, Alameda County Office of Education
- o Nancy LaCasse, K-12 High Speed Network
- o Dr. Pamela Comfort, Contra Costa County Office of Education
- o Rebecca Lacocque, Peralta Community College District
- o Rich Robbins, Wareham Development
- o Sunne Wright McPeak, California Emerging Technology Fund
- o Terry Hermiston, Bayer
- o Dr. Virginia Lehmkuhl-Dakhwe, San Jose State University

EXPO PARTICIPANTS:
- o Bay Area Biotech Education Consortium
- o Contra Costa Economic Partnership
- o Girls Incorporated of the Island City
- o GlassLab
- o Industry Initiatives for Science and Math Education
- o Project Lead The Way
- o Sewer Science with the Dublin San Ramon Services District
- o Techbridge

PUBLIC COMMENT

PUBLIC-PRIVATE PARTNERSHIPS

Courtney Riley, CTE Specialist, Oakland Unified Linked Learning
1. Are private companies ready to be involved with emerging programs and working with students that don't match the current company culture?
2. What are companies doing within companies to "integrate" STEM? What education is available to them? How does that get scaled in "private" environments?
3. Companies can pay to "grow their own" and not use government funds?

David Taus, Director of Programs and Recruitment, EnCorps STEM Teachers Program
I am very disappointed that almost all of the business panelists were not present to listen to the education panel. What does this tell us? It tells us that business does not want to truly invest in a two way conversation, and instead feel they can drive reform without consulting the experts on the ground. This is very dangerous. Mostly because it is an enormous mistake to entrust the future of education to the private sector, or even allow them a moderate degree of influence. Public education should be about equity. Business is deeply set on a philosophy of competition, on winners and losers. This is precisely what the project of public education is here to prevent. If business leaders are not willing to even stay and listen to educators, if the private sector thinks they know better, I would say that they should keep their tablets and laptops, and leave public education to those who live it every day.

Lee Latimer, Ph.D., American Chemical Society
1. No inclusion of professional societies (e.g. American Chemical Society) – huge resource in every part of the state to illustrate careers and engage volunteers.
2. Only heard from large corporations. Most new jobs are in small companies. Small companies need to be engaged possibly through tax incentives and credits.
3. Many professional societies have programs that are doing STEM outreach.

EXTENDED LEARNING

Jeff Davis, Interim Director, California Afterschool Network
I am encouraged to see effective school and summer learning (expanded learning) programs mentioned as a key partner in advancing STEM learning opportunities. We know that California has 4,500 expanded learning programs with approximately 820,000 youth from low-income and high percentage English learner schools. Today is Light on Afterschool, a national celebration of those that "keep the lights on" after school. California has recently been ranked #1 in after school nationally, The California Afterschool Network has partnered with the California STEM Learning Network with funding from Bechtel, Noyce, Samueli, Hewlett Packard foundations to advance STEM learning in expanded learning programs over the past three years through the Power of Discovery: STEM Initiative. This initiative will sunset in September 2015 and illustrates the power of K-12, community, industry, and philanthropy partners. Additionally, one strategy implemented includes getting pre-service STEM teachers to "learn by doing" in after school programs. My question and challenge to business, government, k-12, and high education

is what is your plan to continue to leverage California's expanded learning infrastructure to advance quality STEM learning?

Ian Signer, Director of Education and Partnerships, Life Sciences Foundation
Public and school libraries are critical actors in supporting STEM learning, often leading and experimenting with programs that have yet to be adopted in schools. Libraries can inspire learning in – and beyond – the classroom, and need to be included in STEM education planning.

Eric Gravenberg, Ph.D., President, College of Alameda
After school programs designed to increase STEM education, global leaderships, and entrepreneurship, must include parents in a concurrent/parallel educational delivery system. When parents are included in co-educational and career experiences, it will ensure students overall success.

Dr. Laura Peticolas, Space Sciences Laboratory, UC Berkeley
If we are top in STEM afterschool but last in STEM at school, it would be good to look at successful teacher training through implementation in afterschool. The role of culture in the collaborations and this work is very important and should be considered. This is our team's expertise in Earth and Space Science and Technology.

TEACHER RECRUITMENT AND RETENTION

Jeadi Vilchis, IT Instructor, Year Up
It's clear that the missing link in STEM is highly audited STEM educators. First generation digital natives are at career age. How can we keep tech professionals in Education/NGOs supporting our students when Google/start-ups are very appealing and offering high compensation? It's not sustainable now.

Steve Croft, Ph.D., Astronomy Department, UC Berkeley
To address the problem of lack of teachers with science and math credentials in elementary school, it seems flipped classrooms approaches with lectures and interactives from subject experts would be an idea.

STEAM: ARTS INTEGRATION

Patrick Remer, Contra Costa County Library
I appreciate that STE(A)M was mentioned by a number of participants, especially considering many in education and industry come from backgrounds that foster knowledge of culture, context, and interpersonal relationships. It was striking how many panelists cited their background in music, performing arts, English and other fields that seem to play second fiddle in the "STEM" orchestra.

TECHNOLOGY

Marlene Wilson, Retired teacher, Oakland Unified School District
A few issues that need to be addressed:
1. Completely support the idea that additional support will be needed at the district to implement new technology to keep it working as a tool in the curriculum. Plus, there needs to be professional development for teachers and administrators on its usage.
2. There needs to be more differentiation between k-5, middle school, and 9-12, as they have very different needs.
3. We need k-5 math and science specialists. How can we do it?

California Teacher Advisory Council of the California Science and Technology Council
The California Council on Science and Technology (CCST) and its sponsored organization, the California Teacher Advisory Council (Cal TAC), wishes to acknowledge the leadership of Assembly Member Bonilla as an advocate of science, technology, engineering, and math (STEM) education in California with an emphasis on digitally enhanced education (DEE) and public-private partnerships.

Cal TAC and CCST are resources for government, non-government, profit, and non-profit stakeholders in the state as they collaborate to expand the confidence and proficiency of teachers state-wide in using digitally enhanced education (DEE) in the classroom and making California's students workforce-ready in the 21st century digital world. Cal TAC, which is available to serve as a resource to Assembly Member Bonilla and the California Legislature, brings three critical elements to STEM education in California:

1. K-14 California STEM teachers who are highly accomplished in bringing the wisdom of classroom practice to policy and decision makers in the public and private sectors;
2. Digitally Enhanced Education teaching and learning tools developed by teachers for teachers; and,
3. Partnerships that link academic standards with the use of technology in education.

K-14 California STEM Teachers
Over the past year, Cal TAC's award-winning master teachers representing the K-14 education system have brought the wisdom of practice and classroom perspective to the 21st century game-changing conversation centered on digitally enhanced education (DEE). Cal TAC's attention has been focused on the classroom environment, the teacher, the institutional infrastructure, and the creative partnerships to make California's DEE world-class.

Digitally Enhanced Education (DEE)
While digitally enhanced education has arrived in California's classrooms through initiatives such as the Broadband Infrastructure Improvement Grant, there is little data or evidence-based guidance about what works, for whom, and under which conditions. Cal TAC has been working to facilitate a better understanding of how California can emerge as a leader in digital education.

Through support from the Stuart Foundation and the S.D. Bechtel Foundation, CCST and Cal TAC convened a symposia series, *The Efficacy of Digitally Enhanced Education in California*,

which brought together representatives of the education, technology, policy, research and philanthropic communities and prompted an ongoing conversation among those with distinct, but complementary perspectives on the efficacy of DEE.

Two specific products were developed and published as guides for policymakers and teachers:
1. *The Resource Guide* offers sample frameworks and provides recommendations for successfully integrating educational technology into the classroom.
2. *QUICK Assessment* is a one-page resource designed for on-the-spot use by classroom teachers wishing to determine the quality and appropriate use of digital tools, applications, and resources by students.

Partnerships
The field of educational technology is too complex and is moving too fast for organizations to work entirely as independent entities. Forming partnerships to address some of the most important issues, including ameliorating the educational opportunity gap, preparing and supporting a 21st Century-ready teacher workforce, and crafting policy recommendations that facilitate the use of efficacious approaches to digital teaching and learning is essential.

CCST and Cal TAC have launched new partnerships with Gooru and CSL Net and are exploring partnerships with Common Sense Media/Graphite, California State University (CSU), and WestEd.

DATA COLLECTION

Evan Decker, Mid-Pacific Information and Communication Technologies
Funding regional Advanced Technology Centers to collect relevant workforce data that can be used to support pathways would answer a number of concerns regarding data collection and time.

CURRICULUM

Wendy Plow, Trustee, Campbell Union High School District
There was much discussion from industry on the need for hands-on, project based learning. How do we reconcile this with the push for A-G, which limits hands-on to no more than 20% of a course? Also, the teacher pipeline for CTE must be addressed. Only a handful of schools offer the ITE methodologies course, inhibiting people from obtaining CTE credentials.

IMPLEMENTATION OF NEW STANDARDS

Bryony Ruegg, Biotechnology Explorer Program Manager, Bio-Rad Laboratories
The Next Generation Science Standards will hugely assist many of the goals addressed at the summit. However in our work with educators and administrators in California, they are very concerned with the necessary professional development required to implement NGSS well.

Ann-Marie Walters, Teacher, San Ramon Valley Unified
1. K-12 educators are concerned as they shift practices to align to Common Core State Standards and Next Generation Science Standards that much of the university model will remain and students won't be prepared for the more traditional aspects of higher education. They would like to hear more support of these initiatives from the university systems. Often there are too few lab classrooms.
2. One of the largest barriers is class size. 35-40 high school students in science courses is too high, and it's growing. Inflated class sizes greatly affect students and teachers. And in some cases it has led to lower performing students having little or no access to sciences because with too few classrooms and class sizes busting at the seams, students with A's and B's get priority. All students need hands on access to sciences in safe and appropriate settings.

Bruce Simon, Gateways East Bay STEM Network, CSU East Bay
Education leaders at all levels are currently being asked to manage a tremendous amount of change (CCSS, NGSS, SBAC, LCAP). All of these initiatives require significant investments of time and resources and demand systemic change. Many of our leaders do not have the training and time to effectively manage this change.

MISC.

Alex Madonik, American Chemical Society
It is National Chemistry Week and today is Mole Day. The American Chemical Society represents over 10,000 professionals in California who partner with their local communities to encourage STEM education this week and all year.

Manuel Cortez Rodas, MRCR Education
Thank you for organizing this summit. It has provided a large picture of the need to integrate STEM in all areas of the community (business, education, government) and for all ages (Pre-K–14 and beyond). It will help me continue to support STEAM education.

Tony Lusich, American Society of Engineers
1. STEM is essential for teaching how to be a complete person and how to think and how to make good decisions throughout life. It is fine to talk about computer science and the like but basic engineering, civil and mechanical, has to be encouraged. These engineers make our society, through infrastructure, able to function.
2. Not having a healthy infrastructure system will affect our economic prosperity, as well as our health and safety and welfare. A poorer economy will affect money available for government to function, including the education system. Economic conditions will also affect private industry in their ability to provide their support to education.

Andrea York, The California Community College Association for Occupational Education
California Community Colleges have the tremendous responsibility of providing STEM education to the traditional two year CTE student and preparing students for transfer to a four year program. EWD and Career Pathways Funds are important to providing improved coordination between industry partners and K-12, but we still lack stable funding for the CCC

system to grow CTE programs and partnerships. Assemblyman Muratsuchi recently authored ACR 119, which requests the Chancellor's Office to convene a stakeholders group, including industry, to discuss how to stabilize funding and I encourage participants here to engage in those conversations.

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Bay Area Regional STEM Education Summit: Advancing STEM through Public-Private Partnerships

<u>HEARING AGENDA</u>

Thursday, October 23, 2014
Mills College
Gathering Hall, Lorry I. Lokey Graduate School of Business
5000 MacArthur Blvd.
Oakland, CA 94613
9:00AM – 12:30PM

I.   STEM Initiatives Expo (9:00AM – 9:30AM)

A diverse group of local STEM programs will showcase their work and discuss the partnerships that have made their initiatives successful. These exemplary programs will provide information that can be utilized by other organizations looking to establish or strengthen STEM initiatives.

II.   Opening Remarks (9:30AM – 9:40AM)

- Hon. Susan A. Bonilla, Assembly Member, 14th District
- Hon. Ed Chau, Assembly Member, 49th District
- Dr. Kathy Schultz, Dean of the School of Education, Mills College
- Dr. Elizabeth Watkins, Vice Chancellor of Student Academic Affairs, University of California, San Francisco

III.   Business Panel (9:45AM – 10:40AM)

Business leaders will provide their perspectives on policies needed to advance STEM education, the components of effective public-private partnerships, and how recent educational reforms have changed the business community's approach to supporting public education.

- Terry Hermiston, Vice President of Biologics Research, Bayer
- Sunne Wright McPeak, President & CEO, California Emerging Technology Fund
- Rich Robbins, CEO, Wareham Development
- Jim Vanides, Global Education Program Manager, Hewlett-Packard
- Jim Wunderman, President and CEO, Bay Area Council

IV. **Education Panel (10:45AM – 11:10AM)**

Leaders from K-12 and higher education will respond to the information provided by the business panel and give their input on what is needed to advance STEM education throughout the region.

- Dr. Virginia Lehmkuhl-Dakhwe, Director of the Jay Pinson STEM Education Initiatives, San Jose State University
- L. Karen Monroe, Associate Superintendent, Alameda County Office of Education
- Dr. Barry Russell, President, Las Positas College

V. **Broadband Infrastructure Improvement Grant (11:15AM – 11:30AM)**

Assemblywoman Susan A. Bonilla led efforts to secure $26.7 million in 2014-15 State Budget to support broadband upgrades at K-12 school sites. Panelists will discuss the details of the grant program, the need for coordination between the public and private sector to develop the best possible solutions for broadband upgrades, and the workforce opportunities created by the allocation.

- Andreas Cluver, Secretary-Treasurer, Building and Construction Trades of Alameda County
- Nancy LaCasse, K-12 High Speed Network
- Carolyn McIntyre, President, California Cable & Telecommunications Association

VI. **Career Pathways Trust (11:35AM – 12:00PM)**

In the Budget Act of 2013-14, the Legislature allocated $250 million for the establishment of the Career Pathways Trust in order to create innovative programs and partnerships that link academic standards with career pathways in high-need sectors of the economy. This past budget cycle, the Legislature appropriated an additional $250 million that will be made available through 2017-18. Panelists will discuss the details of their initiatives funded by the Career Pathways Trust and the importance of regional coordination in achieving successful STEM initiatives.

- Dr. Pamela Comfort, Associate Superintendent, Contra Costa County Office of Education
- Rebecca Lacocque, Director of the East Bay Career Pathways Consortium, Peralta Community College District
- Chris Roe, President & CEO, California STEM Learning Network

VII. **STEM Initiatives Expo (12:00PM – 12:30PM)**

A diverse group of local STEM programs will showcase their work and discuss the partnerships that have made their initiatives successful. These exemplary programs will provide information that can be utilized by other groups looking to establish or strengthen STEM initiatives.